Biological Functions of Proteinases

Edited by H. Holzer and H. Tschesche
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The 30th Colloquium of the Gesellschaft für Biologische Chemie was held in April 1979 in Mosbach/Baden and the manuscripts of the 26 lectures that were given are collected together in this volume.

Proteinases were among the first enzymes to be studied in detail and much of our present understanding of how enzyme structure is related to mechanism of catalysis has been derived from investigations carried out with the proteolytic enzymes secreted into the gastrointestinal tract. It would seem most appropriate, then, that the first paper (by Robert Huber) in this book should consider the relationship between the globular structure of a protein and the development of full enzymatic activity (e.g., as trypsinogen is converted into trypsin).

Other physiological roles that have been evolved for limited proteolysis in the generation of active products from precursors are also given extensive consideration. These include virus assembly, blood coagulation, the control of blood pressure, fertilisation, the complement activation processes, the secretion and insertion of proteins across membranes and the increased proteolytic activity associated with transformed cells.

However, in addition to these processes which require mostly extracellular proteolysis, tissue proteins are constantly being turned over inside cells and with this realisation has come a strong desire to understand how the degradation of proteins can be modulated under different metabolic conditions to serve cellular requirements. Thus several papers, beginning with an excellent 'scene-setting' review from the proteolysis group in Halle, examine intracellular protein turnover, the role of lysosomes, the control of steady state concentrations of proteins and the accelerated degradation of proteins for cellular adaptation under nutritional deprivation and differentiation conditions in mammalian cells and microorganisms. The degradation of abnormal proteins is considered and several papers describe the characterisation of individual proteinases that might be involved in cellular proteolysis and how these can be controlled by endogenous inhibitors under physiological, pathological and even remodelling conditions such as the resorption of the uterus post-partum.

Thus, this volume encompasses a wide range of interests. The involvement of proteinases in so many different physiological processes breaches a number of inter-disciplinary frontiers so that the book might have a fairly widespread appeal. The papers included are an unusual collection of review style manuscripts interspersed with presentations of hard data, so that there should be something to suit all tastes.

Perhaps the publication of yet another book on the biological roles of proteinases and their inhibitors reflects the enormous amount of interest that seems to have been kindled in these subjects.

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